UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

STEPHEN BROWN, et al.,	)	
	)	
Plaintiffs,	)	
	)	
vs.	)	Case No. 4:16-cv-00755-AGF
	)	
KIA MOTORS AMERICA, INC., KIA MOTORS MANUFACTURING GEORGIA, INC., and KIA MOTORS CORPORATION,	)	
	)	
Defendants.	)	

MEMORANDUM AND ORDER

This matter is before the Court on the motion (ECF No. 48) of Defendant Kia Motors Manufacturing Georgia, Inc. ("KMMG") to bar the testimony and opinions of Plaintiffs' expert, Mark Sutherland.[1] For the reasons set forth below, the motion will be denied.

BACKGROUND

This case involves a July 5, 2013 fire, which damaged Plaintiffs' home in De Soto, Missouri and their personal property, including their new, 2013 Kia Sorento (the "Kia").[2] Plaintiffs allege that the fire originated in the Kia, which was parked in their

[1] The motion was filed by KMMG and Kia Motors Corporation ("KMC"), but the parties subsequently filed a joint stipulation to dismiss without prejudice Plaintiffs' claims against KMC (ECF No. 61). The Court previously dismissed a third Defendant, Kia Motors of America, Inc., with no opposition from Plaintiffs (ECF No. 38). Therefore, KMMG is the only remaining Defendant.

[2] Plaintiffs' insurers Safeco Insurance Company of America, Safeco Insurance

garage, and that the fire was caused by a defective and unreasonably dangerous condition in the Kia. Plaintiffs assert claims for strict liability, negligence, and breach of warranty.

Plaintiffs retained Sutherland, an electrical engineer and certified fire and explosion investigator, as an expert witness to opine as to the origin and cause of the fire. In connection with his investigation, Sutherland conducted a site inspection of Plaintiffs' home on July 31, 2013; inspected the Kia on November 6, 2013; inspected Plaintiffs' boat, which was also parked in the garage at the time of the fire, on January 10, 2014; inspected an exemplar Kia Sorento on July 17, 2015;[3] and reviewed the documents produced by Defendants in discovery and the transcripts of depositions of party and non-party witnesses.

Sutherland opined that the fire originated in the front wiring harness on the driver's side of the Kia's engine compartment.[4] This front wiring harness delivers electrical current to certain vehicle components and is designed to be held in place by

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Company of Illinois, and Progressive Northwestern Insurance Company were assigned the rights to pursue this action after they reimbursed Plaintiffs for the damage to their home and personal property, their vehicle, and their boat. Plaintiffs filed this subrogation action on behalf of these insurers.

[3] Sutherland examined a 2012 Kia Sorento. Plaintiffs assert, based on the deposition testimony of one of Defendants' engineers, that the configuration of the relevant portion of the vehicle—the front wiring harness—was the same for Kia Sorento vehicles from 2009 to 2013. KMMG has not disputed this assertion.

[4] The Jefferson County Fire Investigators, who responded to the fire, also concluded that the fire originated in the front area of the Kia.

plastic clips. Sutherland provided the following opinion regarding the cause of the fire:

> The circumstances that caused the fire started with a manufacturing defect in the [Kia]. The front wiring harness was not properly secured to the vehicle, which allowed the wiring harness to come in contact with the sharp edge of the front fender. This resulted in an abrasion of the wiring sleeve and insulation, allowing the wiring harness to electrically short to the grounded vehicle frame which resulted in the fire.

ECF No. 57-6 at 18. Sutherland further opined that "[t]he wiring harness failure was the result of an installation error during the manufacturing of the [Kia]." *Id.*

Sutherland's report stated that his opinions were based on the scientific method as outlined in the National Fire Protection Association ("NFPA") Section 921, a guide for fire and explosion investigations. As to the origin of the fire, Sutherland stated that he followed NFPA 921's instruction to coordinate information from witness statements; fire patterns; arc mapping;[5] and fire dynamics, described as the "physics and chemistry of fire initiation and growth and the interaction between the fire and the building[]." *Id.* at 9.

As to causation, Sutherland stated that he followed NFPA 921's instructions to identify the factors necessary for the fire to have occurred, including "[t]he presence of a competent ignition source; [t]he type and form of the first fuel ignited; and [t]he circumstances, such as failures or human actions, which allowed the factors to come together and start the fire." *Id.* at 12. Sutherland also stated that he considered other

[5] "[A]rc mapping" has been described as "investigating the way in which the fire damaged the home's electrical circuits." *Russell v. Whirlpool Corp.*, 702 F.3d 450, 455 (8th Cir. 2012).

potential ignition sources, including the boat battery charger, electrical appliances in the garage, and the garage electrical system, but he ruled out these sources based on arcing, fire dynamics, burn damage, the fact that the devices were not plugged in at the time, and the lack of any noted failure or malfunction on these devices. *Id.* at 15.

In an affidavit submitted in connection with Plaintiffs' response to the current motion, Sutherland attested that he has performed over 1,000 fire investigations, including over 300 scientific and engineering evaluations alleged to be associated with vehicles, 150-200 of which involved electrical-based fires and manufacturing defects. Sutherland further attested as to his extensive experience in investigating the wiring and engine compartments of vehicles to determine if a manufacturing or design defect caused a fire, including his experience offering opinions on vehicle design and manufacturing defects as an expert witness in nine cases. Sutherland attested that he has never been disqualified from offering an expert opinion as to the cause and origin of a vehicle fire, or as to the presence of a manufacturing defect in a vehicle. ECF No. 57-7.

As to his opinion regarding the improper installation of the front wiring harness, Sutherland's report stated that he found a piece of the harness welded to the edge of the Kia's body at the interior of the engine compartment. The harness contained 10 heavy wires, three of which were rated for 60 amps of current. According to Sutherland, at the time of his inspection of the Kia, the harness was found approximately three inches below and three inches in front of the place where the harness was secured in the

exemplar vehicle.

Sutherland testified at his deposition that the basis for his opinion that the wiring harness was not installed correctly, as opposed to the fire having caused the harness to move from its intended location, was that the harness was rigid as a result of the heavy gauge wires running through it, and the harness would not have moved a distance of three inches without the application of outside forces acting upon it. Sutherland testified that the fire would not have caused the harness to move, even if the clips had melted, and the only way the harness would have moved from its designed location to the location where it was found in the Kia was if the wire itself melted. And based on Sutherland's inspection, the wire in this case never reached the melting point. ECF No. 57-8, Sutherland Dep. at 158-161.

Sutherland further based his opinion on his inspection of the exemplar vehicle. He testified that he removed the plastic clips securing the harness in the exemplar vehicle, and the harness did not move. Rather, he had to apply physical pressure to move the exemplar harness to the location at which it was found in the Kia. Thus, Sutherland opined that the Kia's harness must have been out of position at the time the Kia left the factory. *Id.* However, Sutherland admitted that he did not specifically test for how much pressure was necessary to move the harness the three inches in question, he did not conduct any testing to evaluate the effect of the fire upon the rigidity of the harness, and at the time that he applied physical pressure to the exemplar harness, the harness was not being subjected to heat. *Id.* at 161-63.

As to the ignition of the fire, Sutherland testified that, based on his examination of the Kia and his prior experience in conducting prior live vehicle burn tests to simulate vehicle fires and electrical failure modes, the heat produced at the point where the harness wires were welded to the Kia's frame was sufficient to ignite the wire insulation and the protective nylon sleeve that encased the circuits in the harness; Sutherland opined that the fire thereafter continued to spread to other combustible items in the engine compartment. *Id.* at 105-06. Sutherland based his opinion on the information about electrical shorts and ignition of fires in NFPA 921 and the *Ignition Handbook* by Vytenis Babrauskas, Ph.D.[6] *Id.* at 133-34.

However, Sutherland admitted that he had not conducted any independent testing to verify how much pressure was necessary for the wire to become "exposed as a contact point for the short." *Id.* at 163. Sutherland further admitted that all circuits within the front wiring harness were fused—the effect of the fuse being to limit the amount of current that could flow in the event of an electrical short—and that he had not examined the fuses. Sutherland testified that he had not measured "the amount of time between when a short occurs on that circuit and when the fuse actually blows"; nor had he tested "how long it would take an electrically shorted wiring harness to ignite into fire." *Id.* at 165-66. In response to questioning as to his lack of testing of whether the fuses in the harness would have shut down the circuit in sufficient time to prevent a

[6] Plaintiffs assert, and KMMG does not dispute, that the *Ignition Handbook* is considered an authoritative text by the forensic fire investigation community and was also relied upon by one of Defendants' experts.

fire, Sutherland testified as follows:

> A fuse itself is either open or closed. There's no time involved . . . . Circuit breaker there's time. Fuses operate on a different principle. They only operate on current flow. So when they reach a certain current flow, they open and it's instantaneous. There's no shutdown procedure or anything involved. . . . So when a short could occur and it could continue to—to provide power as long as that short never exceeded the rating of the fuse. So these 60-amp fuses, it may never detect that short.

Id. at 175-76.

ARGUMENTS OF THE PARTIES

KMMG contends that Sutherland is unqualified to offer expert opinions as to any alleged manufacturing defect in the Kia. KMMG argues that, although Sutherland may be an expert in electrical engineering and fire investigation, he is not qualified as an expert in automotive design, engineering, and manufacturing. KMMG further argues that Sutherland's fire-causation opinions are unreliable and irrelevant because Sutherland did not adequately test his opinions regarding (1) the improper installation of the front wiring harness, and (2) the ignition sequence, including the contact between the harness and front fender, the abrasion of the wiring, the electrical short, and the resulting ignition.

As to the first causation opinion regarding the position of the harness, KMMG argues that Sutherland conducted no testing to determine the amount of pressure necessary to move the harness, particularly when heat or fire is applied, and therefore has no basis to deny that the clips holding the harness could have been melted by the fire, allowing the harness to slip into its post-fire position. As to the second opinion,

KMMG points to the fact that Sutherland conducted no testing to evaluate how much pressure would be necessary to cause abrasion of the wiring, or how much time it would take for an electrically shorted wiring harness to ignite into a fire, instead relying on texts such as the *Ignition Handbook*. KMMG contends that a KMC engineer testified in a deposition in this case that he conducted "short circuit testing" on electrical components in Kia vehicles, which showed that an electrical short of the kind alleged here would cause a fuse to blow within milliseconds, thus preventing any possibility of a fire.

In response, Plaintiffs argue that Sutherland is well qualified to offer opinions as to the manufacturing defect in the Kia, in light of Sutherland's extensive education and experience in investigating electrical-based fires, and particularly, electrical-based fires in vehicles. Plaintiffs contend that, as evidenced by his affidavit, Sutherland has investigated hundreds of electrical-based vehicle fires, has conducted live burns of over 20 vehicles for the purpose of understanding vehicles fires, and has testified as an expert witness in federal and state courts regarding defective vehicles.

Plaintiffs further contend that Sutherland's fire-causation opinions are reliable and relevant. Plaintiffs argue that Sutherland adequately tested his theory that the wiring harness was improperly installed by inspecting the exemplar vehicle and physically testing the ability of the harness to move with the clips removed, as well as evaluating the parameters under which the harness could move. Plaintiffs likewise contend that Sutherland's opinions as to the ignition sequence are supported by the

physical evidence in this case, as well as published and accepted principles in the scientific fire investigation community. Plaintiffs further argue that KMC made certain admissions regarding the danger of placing the harness too close to sharp edges, pointing to the deposition testimony of a senior research and development engineer, who stated that KMC designed the routing and securing of the front wiring harness to keep it a minimum distance of 10 millimeters away from sharp edges.

Next, Plaintiffs contend that Sutherland's explanation that "fuses don't operate within a time parameter after a short develops and instead must detect a current flow above their rating to open, . . . dispels [KMMG's] claims that the fusing of the vehicle made it impossible for the fire to have occurred . . . ." ECF No. 57 at 15. Finally, Plaintiffs contend that KMC's short circuit testing "did not address the portions of the 50 or 60 amp circuits at issue; instead, [KMC] tested the portions of the harness that were protected by lower-rated fuses," such as "7.5, 10, 15, and 20 amps," and in any event, any perceived conflict between Sutherland's opinions and KMC's short circuit testing could be explored in cross examination. *Id.* at 15-16.

In reply, KMMG reiterates that Sutherland's fire-causation opinions are unreliable. KMMG maintains that Sutherland's testimony regarding the "electrical shorts involving circuit breakers and fuses" is scientifically inaccurate, and that KMC's short circuit testing "indicates the fuse would have blown in a matter of milliseconds." ECF No. 60 at 12-13. KMMG also asserts new arguments in its reply brief, including that Sutherland did not conduct a sufficient investigation before concluding that the fire

originated in the Kia because Sutherland failed to rule out alternative sources of the fire, including failing to adequately investigate "the totality of physical and electrical components in the garage." *Id.* at 3-9, 14.

DISCUSSION

The admission of expert testimony in federal court is governed by Federal Rule of Evidence 702. *Wagner v. Hesston Corp*., 450 F.3d 756, 758 (8th Cir. 2006). Rule 702 provides:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
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> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
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> (b) the testimony is based on sufficient facts or data;
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> (c) the testimony is the product of reliable principles and methods; and
>
> (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702. The rule was amended in 2000 in response to *Daubert v. Merrell Dow Pharms., Inc*., 509 U.S. 579 (1993), which charged trial judges with a "gatekeeping" role to exclude unhelpful and unreliable expert testimony.

Factors relevant to the reliability and relevancy determinations include: "(1) whether the theory or technique can be or has been tested; (2) whether the theory or technique has been subjected to peer review or publication; (3) whether the theory or technique has a known or potential error rate and standards controlling the technique's

operation; and (4) whether the theory or technique is generally accepted in the scientific community." *Russell v. Whirlpool Corp*., 702 F.3d 450, 456 (8th Cir. 2012) (citations omitted). Additional factors include "whether the expertise was developed for litigation or naturally flowed from the expert's research; whether the proposed expert ruled out other alternative explanations; and whether the proposed expert sufficiently connected the proposed testimony with the facts of the case." *Lauzon v. Senco Prods., Inc*., 270 F.3d 681, 686 (8th Cir. 2001).

"[T]he *Daubert* reliability factors should only be relied upon to the extent that they are relevant and the district court must customize its inquiry to fit the facts of each particular case." *Shuck v. CNH Am., LLC*, 498 F.3d 868, 874 (8th Cir. 2007); *see also Unrein*, 394 F.3d at 1011(stating that the "evidentiary inquiry is meant to be flexible and fact specific, and a court should use, adapt, or reject *Daubert* factors as the particular case demands"). There is no single requirement for admissibility as long as the proffer indicates that the expert evidence is reliable and relevant. *Unrein*, 394 F.3d at 1011. The question is whether the expert's opinion is sufficiently grounded to be helpful to the jury. *Id.* at 1012.

Although the proponent of the expert testimony must prove its admissibility by a preponderance of the evidence, *Daubert*, 509 U.S. at 592, Rule 702 "is one of admissibility rather than exclusion." *Shuck*, 498 F.3d at 874. "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible

evidence." *Olson v. Ford Motor Co*., 481 F.3d 619, 626 (8th Cir. 2007). Proposed expert testimony "must be supported by appropriate validation - i.e., good grounds, based on what is known"; expert "knowledge connotes more than subjective belief or unsupported speculation." *Daubert*, 509 U.S. at 590, 599 (citation omitted). But any "doubts regarding whether an expert's testimony will be useful should generally be resolved in favor of admissibility." *Clark v. Heidrick*, 150 F.3d 912, 915 (8th Cir. 1998).

Sutherland's Qualifications

In light of Sutherland's expertise in electrical engineering and fire investigation—which KMMG does not dispute—as well as his specialized experience in the investigation of vehicle electrical fires, the Court concludes that Sutherland is qualified to offer his opinion regarding the alleged manufacturing defect in the Kia as it relates to fire causation. *See, e.g.*, *Am. Auto. Ins. Co. v. Omega Flex, Inc.*, 783 F.3d 720, 726 (8th Cir. 2015) (holding that a fire investigation expert was qualified to render an opinion refuting a theory that a lightning strike generated sufficient energy to create holes in or ignite a gas pipe, notwithstanding that the expert was not a metallurgist or lightning expert, because "his testimony only touched upon those fields as relevant to the subject of fire causation, his area of expertise"); *Brown v. Ford Motor Co.*, 121 F. Supp. 3d 606, 613 (S.D. Miss. 2015) (holding that Mark Sutherland, the expert in this case, was qualified to offer opinions that a defect in a vehicle's speed control deactivation switch, a "SCDS," caused a fire, notwithstanding that Sutherland had no

experience in the specific area of automotive design or manufacturing, because "Sutherland is an electrical engineer who has familiarity with the way SCDS functions").

Reliability of Fire Causation Opinions

"In the context of fire investigations, [the Eighth Circuit has] held expert opinions formed on the basis of observations and experience may meet th[e] reliability threshold [under Rule 702]." *Russell*, 702 F.3d at 457. KMMG's arguments focus on Sutherland's lack of testing with respect to two aspects of his opinions: (1) that the harness was improperly positioned when it left the factory; and (2) that an electrical short caused the fire to ignite.

But testing is not absolutely required to support a fire causation opinion. *See Shuck*, 498 F.3d at 875 n.3 (explaining that the Eighth Circuit precedent has not established a "bright line rule that expert opinions in fire cases always must be supported by testing to be admissible"). Rather, cases such as *Fireman's Fund Ins. Co. v. Canon U.S.A., Inc.*, 394 F.3d 1054 (8th Cir. 2005), and *Presley v. Lakewood Eng'g & Mfg. Co.*, 553 F.3d 638 (8th Cir. 2009), relied upon by KMMG here, merely "stand for the simple proposition an expert who purports to follow NFPA 921 must apply its contents reliably."[7] *See Russell*, 702 F.3d at 455.

Moreover, Sutherland did test his opinion as to the positioning of the harness by

[7] Nor is NFPA 921 the only reliable way to investigate a fire. *Russell*, 702 F.3d at 455.

manipulating the harness in the exemplar vehicle. Any perceived deficiencies in the extent and nature of Sutherland's testing are matters going to the weight of Sutherland's opinion and may be explored on cross examination. Likewise, Sutherland's opinion as to the ignition sequence is adequately supported by his examination of the physical evidence, his prior experience conducting live vehicle burn tests to simulate vehicle fires, and the information in about electrical shorts and ignition of fires in authoritative texts, such as the *Ignition Handbook*. *Werth v. Hill-Rom, Inc.*, 856 F. Supp. 2d 1051, 1063-64 (D. Minn. 2012) ("To be sure, NFPA 921 § 4.3.6 provides that a hypothesis can be tested either physically by conducting experiments or analytically by applying scientific principles in thought experiments.").

KMMG's primary challenge to Sutherland's ignition opinion is that Sutherland failed to adequately account for the impact of fuses, and more specifically, KMC's short circuit testing. But the applicability of KMC's short circuit testing to the particular fuses and circuits at issue is a matter of dispute between the parties. KMMG may use that testing and any other contrary evidence, as well as vigorous cross examination, to highlight any gaps in Sutherland's methodology. Sutherland's methodology is not so unreliable as to warrant exclusion. *See, e.g.*, *Brown*, 121 F. Supp. 3d at 612-15 (holding that opinions by the same expert, Sutherland, as to the causation of a vehicle fire, including that the vehicle's speed control deactivation switch was defective, were sufficiently reliable, and any omissions in methodology went to

weight rather than admissibility).[8]

Additional Arguments

KMMG's remaining arguments, regarding Sutherland's alleged failure to adequately investigate the fire's origin by failing to rule out alternative sources, are not properly before the Court as they were raised for the first time in a reply brief. *See Valentine v. Midland Funding, LLC*, No. 4:16 CV 1520 CDP, 2016 WL 7439215, at *2 (E.D. Mo. Dec. 27, 2016). In any event, the Court's review of Sutherland's report and deposition testimony reveals that his opinion regarding the point of origin is adequately supported by witness statements, fire mapping, arc mapping, and fire dynamics, in accordance with NFPA 921. The Court also concludes that Sutherland adequately considered and ruled out alternative causes. Any deficiencies with respect to these aspects of Sutherland's opinions again go to the weight of the opinions, not admissibility. *See, e.g.*, *Hickerson*, 470 F.3d at 1257 (holding that a fire investigation expert's opinions as to point of origin and alternative causes were reliable where "he examined burn patterns, examined heat, fire, and smoke damage, considered this evidence in light of testimony regarding the fire, and . . . considered as possible causes of the fire those devices that contained or were connected to a power source and that were located at the identified point of origin"); *Russell*, 702 F.3d at 457-58 (holding the

[8] The *Brown* court did exclude Sutherland's opinion as to a feasible design alternative for the allegedly defective switch in that case. *See Brown*, 121 F. Supp. 3d at 615. But the instant case does not involve a design defect, and Sutherland does not purport to offer such a design-alternative opinion here.

same where the investigator documented the scene, interviewed residents, and "[b]ased on the burn patterns [of the kitchen] appliances, the near-complete destruction of the refrigerator, its position at the bottom of the debris, and the metal thickness variation at the bottom part of the refrigerator frame, . . . concluded the fire started in the refrigerator").

CONCLUSION

For the reasons set forth above,

IT IS HEREBY ORDERED that Defendants' Motion to Bar the Testimony and Opinions of Plaintiffs' Expert Mark Sutherland is **DENIED**. ECF No. 48.

Audrey G. Fleissig

AUDREY G. FLEISSIG
UNITED STATES DISTRICT JUDGE

Dated this 20th day of March, 2018.